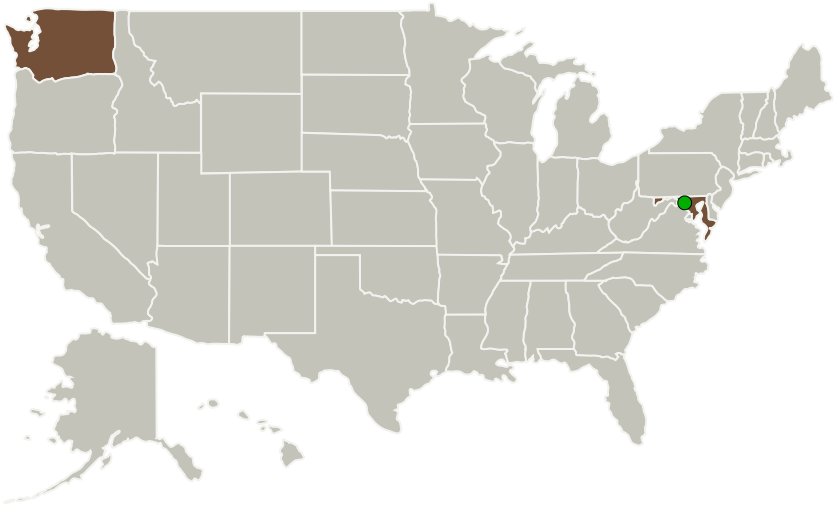
High Throughput Soft X-Ray Filters with Enhanced IR-Rejection, Phase I

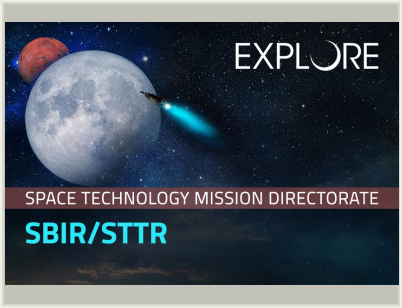
Completed Technology Project (2011 - 2011)

Project Introduction

To fully realize the advances NASA has made in x-ray microcalorimeter detectors, x-ray filters with enhanced out-of-band performance are needed. Blocking filters are essential components in these cryogenic detectors to minimize thermal load while admitting the soft x-rays of interest. Theoretically, an aluminum coating 15-20 nm thick, on each filter in the stack will provide the necessary IR attenuation. In practice, coatings this thin are less optically dense than predicted, and thickness must be nearly doubled to achieve sufficient thermal blocking. This degrades performance. The proposed innovation is to improve the thin aluminum blocking layer to increase its optical density and thermal rejection performance. Preliminary work suggests it is possible to increase the visible and IR light rejection of aluminized polyimide by a factor of 3 or more. In Phase 1, test samples will be made through altered processes. Film microstructural changes, x-ray, IR, and visible light transmission will be measured to identify process parameters that enhance IR blocking. Once optimized, coatings will provide equivalent IR blocking with thinner layers, enhancing mission throughput for the sounding rockets XQC and Micro-X in the near term and provide needed technology enhancements to make possible future missions such as IXO.

Primary U.S. Work Locations and Key Partners





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Organizations Performing Work	Role	Type	Location
Luxel Corporation	Lead Organization	Industry Small Disadvantaged Business (SDB)	Friday Harbor, Washington
Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland

Primary U.S. Work Locations	
Maryland	Washington

Project Transitions

February 2011: Project Start

September 2011: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/138226)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Luxel Corporation

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

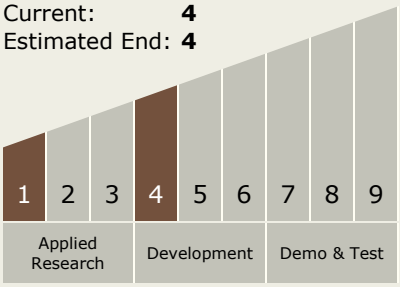
Carlos Torrez

Principal Investigator:

David Grove

Technology Maturity (TRL)

Start: **1**
Current: **4**
Estimated End: **4**



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Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.2 Observatories
    - TX08.2.1 Mirror Systems

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System